

JULY 15, 1918

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AVIATION AND AERONAUTICAL ENGINEERING



Handley-Page Bomber Climbing "All Out"
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VOLUME IV
Number 12

Two
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SPECIAL FEATURES
THE FIRST AMERICAN HANDLEY PAGE BOMBER
THE A. E. G. TWIN ENGINE BOMBER, G105
THE FOKKER WING TRUSS
THE PFALZ PURSUIT BIPLANE

PUBLISHED SEMI-MONTHLY
BY
THE GARDNER, MOFFAT CO., Inc.
120 W. 32nd ST. NEW YORK

Entered as second-class matter, August 3, 1916, at the Post Office at New York, N. Y., under No. 100,000.

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Continued on Page 8

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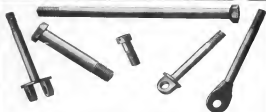
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THE WAR INDUSTRIES BOARD has directed that beginning July 15, newspapers "discontinue the acceptance of the return of unsold copies."

It is expected that this order will be followed by another order directing the publishers of semi-monthly publications, such as **AVIATION AND AERONAUTICAL ENGINEERING**, to discontinue accepting from news dealers any copies that have been placed in their hands for sale.

EXPLANATION

The custom in the periodical publishing business for years past has been to place in the hands of the American News Co., such copies of each edition as are required by the news dealers of the country for their stands. The American News Co. through its excellent organization distributes these copies to the dealers, taking care to place no more copies with any news dealer than he is considered capable of selling.

In this way, the American News Co. looks after the interests of both the publisher and the news dealer, and acts as a valuable circulation builder, as it is to the company's advantage to sell to the dealers the largest possible number of copies that they can sell—and no more.

Any copies that are unsold by the dealers are sold back to the American News Co. which in turn returns them to the publisher.

A CONSERVATION MEASURE

This system has worked out for the benefit of the publishers and for the readers of prominent publications, but it now looks as if it must be radically modified, as the need for conservation of print paper is such that it is believed that at an early date The War Industries Board will direct that the privilege of returning unsold copies be entirely done away with.

The American News Co. will then buy no copies of any periodical that it cannot sell to its dealers and the dealers will probably purchase no copies that they are not positive can be sold. This will undoubtedly cause a great curtailment in the number of periodicals carried on newsstands.

Dealers in order to protect themselves will keep in stock only sufficient copies of periodicals to take care of *orders* placed in their hands. It will therefore be difficult to secure any publication regularly from a news dealer unless an advance order is placed with him for regular service.

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By SERGEANT ALEXANDER KLEMIN

Aviation Section, Signal Corps, U. S. A., in charge of Aeronautical Research Department, Airplane Engineering Department. Until entering military service, in charge of Department of Aeronautics, Massachusetts Institute of Technology and Technical Editor of Aviation and Aeronautical Engineering.

Based on a series of articles in Aviation and Aeronautical Engineering by Alexander Klemm and T. H. Hoff, S.B., Aeronautical Engineer for the Standard Aero Corporation, formerly instructor in Aeronautics, Massachusetts Institute of Technology.

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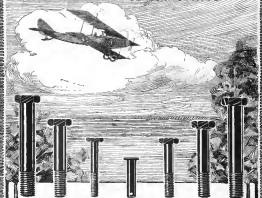
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JULY 15, 1918

AVIATION AND AERONAUTICAL ENGINEERING

VOL. IV, NO. 12

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THE GARDNER-MOFFAT COMPANY, Inc., Publishers

120 WEST 32D STREET, NEW YORK

WASHINGTON OFFICE: 30 EVENING STAR BUILDING

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Vol. IV

July 15, 1935

No. 18

The First American Handley Page

During the past year the Standard Aircraft Corporation has secured practically the entire range of military types in three classes, from the primary training machine to the large Caproni and Handley Page bombers. The intermediate types include an advanced training machine fitted with a Hispano-Suiza engine, the McDonnell reconnaissance, day bombing, and defense D. H. 4 modified reconnaissance, day bombing, and defense day fighting machine. The advanced training machine is the

The main object of the public flights of the Handley Page at Dayton on July 1 was to convince for the first time the employees of the Standard company what their splendid work and cooperation had accomplished, and to serve as an inspiration for the future. The enthusiasm of the workers who took part in the operation, the extraordinary success, and enhanced the flight was ample evidence that a good idea had been translated into performance.



TRYING THE ENGINES OF THE HANDLEY PAGE TO ITS FIRST FLIGHT

Control Photo Service

new type as the primary training machine with certain refinements and changes in the front and for the Hispano-Suiza engine. The McDonnell successfully passed the first official tests without change, as being demonstrated before officials at Washington at the Polo Field. The primary, advanced training and most machines are all from designs by Charles H. Day, Chief Engineer of the company.

The Standard company is the first in this country to complete rather a large Caproni or Handley Page bomber. All production and engineering matters were left to the Standard company's hands. The Caproni was started in January 25 and left the plant the first week in May. The trial flights were delayed for six weeks, awaiting the receipt of Liberty engines of more recent production machines. The first flight was made July 4, and was successful in every respect. An interesting comparison between the two large bombing machines is afforded by the fact that the three-engined Caproni carries six pounds to the horsepower, while the Handley Page two-engined machine carries twenty pounds to the horsepower. The fact that these two large foreign machines were reproduced in an April 1935 place under American production methods in less than schedule time, and that they were 90 per cent perfect the first time they flew, is a performance which speaks well for the production of these types in sufficient quantities.

At the same time the invited guests, officers of the Army and Navy, and Government officials, as well as the large number of citizens who witnessed the events from the side lines, carried away with them strong impressions of the magnitude of this country's efforts in the air, and a better perspective of what could be reasonably expected in the future.

The occasion also served to present in the proper light the magnitude of the proposition which has recently been given exaggerated publicity in the press, of building 20,000 Handley Page machines with which to bomb Germany off the map. In these statements it has been pointed out that the type of Handley Page completed by the Standard Aircraft Corporation was an obsolete model, dating from 1918. Specific information secured from representatives of the British War Board now in this country, Handley Page engineers, and an American officer who has just returned from a visit to the Handley Page works in England, places an entirely different aspect on these exaggerated statements.

The new airplane is an O-400 type, which had only been put in production by Handley Page early in April of this year. This machine is only sixty days behind the British production of similar types. The difference between the two-engined O-400 type and the super-Handley Page is only the difference between the carrying capacity of two automobile trucks. The O-400 is now in production in England and it is

forms of the head and apart from this, the opening is only lengthened on each side of the wings.

Between the same ribs are three ribs running from the leading edge to a point a few inches behind the leading edge and



FIG. 2

appearing only in the upper surface. One of these ribs also is described in Fig. 3. It is an oval, in cross-section, a semi-circular saddle and a winging of tape which passes on through holes in the ribs. Where it meets the leading edge it is furnished with triangular packing pieces, which locate and hold it in position. The lower planing edge is in upper surface with about equal thickness under the engine, and between there and the body is fixed a strip of corrugated aluminum which acts as a diaphragm. The fabric is attached to the main spar and to the back up edge of the wing.

The two surfaces are joined together behind the main spar, which acts as a wing spar, and the main spar is the actual leading edge, which is referred to as a rear main spar of tension.

The wing structure is internally braced in cross-section and reinforced.

pieces and reinforced ribs. A single ribbing is provided for the attachment of the camber, struts and the winging of the leading edge. This ribbing is shown in Fig. 4. It is a light rib on the span, to which it is fixed in a full end or forward with an extension back some 10 inches, as an attachment for the leading edge, which is a continuous extension of the same rib running on for the bearing edge. It is provided with a cap-shaped upper extension, which is a curved and a steel band which carries the bulk of the air under wing and also acts as a wing plate for the complete bearing edge. As shown in the sketch, the fabric is run into the space between the upper and lower fingers of this ribbing, the whole making a very neat job.

Spars—There are three air spars and one rib, all of which are made of steel. The spars are made of steel and are made of steel. The ribs are made of steel and are made of steel.

supported in the middle of the span, as in the full shown in Fig. 4 and in the full shown in Fig. 5. The main spar is connected to the winging of lateral freedom, as in the usual type as in the case of German design.

Body—The whole of the body is built up of steel tubes welded together. It is of plain rectangular section and the nose ribs are attached directly to the main spar without the intervention of any clips. This kind of construction is shown in Fig. 6, which also illustrates the angle and double legs which are used for the purpose of securing the bearing edge. Under the main spar and at the neighborhood of the main spar, the body is reinforced with a ribbed steel frame. Fig. 7 shows the manner in which the upper ribs of the body are put in with sections of the ribbed steel frame.

The fitting sections of two ribs and steel plates welded into position to form an integral part of the frame just the front one of the

Diagonal legs provided with legs for the purpose of bearing the main spar. The main spar is secured in a way at about an angle, and together in a way.

Diagonal legs provided with legs for the purpose of bearing the main spar. The main spar is secured in a way at about an angle, and together in a way.

between the main spar and the main spar, which is a way at about an angle, and together in a way.

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is previous German standards, but the construction would appear to be light.



FIG. 10

Upper Forward—As shown in the photographs, the engine is almost completely enclosed in a housing composed of detachable aluminum plates. The necessary framework and pipes are provided for inside locally, enclosing the engine, but a small opening at the lower end near the head of the plates has been discarded. The tubular framework which supports the plates is an elaborate piece of work, comprising a number of welded joints. At present of 30 inches in diameter, which are attached legs for carrying the necessary tanks. The framework is made in two halves so as to be easily disassembled, and a pair for that purpose is made, as shown in the sketch Fig. 12. It will be noted that a carriage for the oil of the pump over the engine is provided at the rear end of the engine case, as shown.

Engine Mount—The engine is mounted in a framework which is made in two halves so as to be easily disassembled, and a pair for that purpose is made, as shown in the sketch Fig. 12. It will be noted that a carriage for the oil of the pump over the engine is provided at the rear end of the engine case, as shown.

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Two subsidiary tanks used solely for starting purposes and giving a greater supply are connected to the intake system of the two main tanks and are of roughly rectangular form. Between them is a small opening containing their level gauges, which are visible from the pilot's seat. On the right hand side of the main cockpit is fixed a hand-operated wing pump, the second of which is to draw gasoline from either of the main tanks and direct it to the gravity tanks. Pipes from all four tanks are taken to a distributing manifold on the dashboard, and by means of main taps through the supply of gas to the gravity tanks. One of the tanks is to either engine or both. Two additional taps are provided on the wing pump, so that the fuel for the gravity supply can be drawn from either main tank as required. Fig. 16 clearly shows the arrangement of the gasoline taps, which are at the pilot's wing tap. It would appear that the troubles associated with this form of tap have been overcome, as they show no signs of leaking or sticking.

The level of the main tanks is indicated on the dashboard by two Mercury gauges. These connected to the gravity tanks are made by Luster and supply the entire fuel pressure. They read up to 45 lb. per sq. in. from zero to this point being given by one and a half complete revolutions of the indicating hand.

Gravimetric Pressure System—The sketch Fig. 17 also shows the arrangement of the gasoline pressure system. The main pressure pump is mounted on each engine, and the gravity tanks are connected to the dashboard. This is also connected to a large hand pump on the right-hand side of the pilot's seat, the pump being the pressure pump, which provides a direct flow of fuel to the gravity tanks of the whole system.

The sketch Fig. 17 also shows the arrangement of the gasoline pressure system. The main pressure pump is mounted on each engine, and the gravity tanks are connected to the dashboard. This is also connected to a large hand pump on the right-hand side of the pilot's seat, the pump being the pressure pump, which provides a direct flow of fuel to the gravity tanks of the whole system.

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FIG. 14



FIG. 15



FIG. 16



FIG. 17



FIG. 18



FIG. 19



FIG. 20



FIG. 21



FIG. 22



FIG. 23



FIG. 24



FIG. 25

Lawson

AIRCRAFT



THE PRODUCT



THE PLANT

From Green Bay Press-Gazette

May 2nd, 1918

NEW MACHINE OF LAWSON COMPANY MAKES FLIGHTS

Six Trials Made and Members
of Company Taken as
Passengers.

CRAFT HANGS HIGH IN
AIR 15 MINUTES

Hovers Stationary at Altitude of 5,000 Feet, Many
People See Flight.

The latest airplane to be turned out at the Lawson Aircraft plant in Green Bay was tried out from the hangar field in the afternoon and of this city this morning with an engine of 1000, having altogether two hours, and while successful.

The tests were made by Alfred W. Lawson and George Patton, and in the United States army flying school.

Mr. Patton, it is said has been a flying instructor for the United States government ever since the war started and prior to that time he was a pilot for the American government with the title of captain in the United States army.

At 1000 hours this morning Mr. Patton took the machine up for the first time and when he landed and the machine flew perfectly.

Mr. Patton made two fifteen minute flights and then Mr. Lawson took the machine himself for a 1500 feet over Green Bay and De Pere at 1000 in the afternoon.

was one of the 1000 foot machine and at one time he kept the machine steady in a stationary position over the hangar of Green Bay for fifteen minutes at a stretch and at an altitude of 1000 feet.

From the ground the machine appeared to just hang motionless in the air.

Patton Taken Machine.

After Mr. Lawson's flight Mr. Patton took the machine and took up for ten minutes. Patton, John David, George Hays and William Hays, all of the Lawson company. They expressed great enthusiasm and admiration for the machine upon the conclusion of their flight and it was their first experience in the air. The flight attracted wide attention throughout the city.

Mr. Patton said: "It is the most wonderful machine I have ever flown. In fact the machine flies itself, the engine merely starts and the machine responds. The other people are going to get the benefit of their own when they get into new machines. It has everything that is needed for the most up-to-date work as far as advanced training and reconnaissance is concerned. I wish they were 1000 of them, ready for the government use. There are 1000 of them now in some of the details in the Lawson plant than I have ever seen in any other place before, but of course these details are secret and I cannot say any thing about them."

Unusual Trials.
An unusual tribute was paid to the memory of the late Robert H. French, who was the Lawson Aircraft Company when Mr. Lawson flew over his grave in an airplane and a flag was flown in the ground as a token of his success for the dead man. The funeral took place this morning at 1000 hours.

THE PERFORMANCE

LAWSON,
GREEN BAY, WIS.

Admiral Sims on the Liberty Engines

The Secretary of the Navy has authorized the following statement on July 5:

"Secretary Daniels today received a dispatch from Vice Admiral Sims stating that the recent tests of a seaplane equipped with the Liberty engine resulted in better performance as regards speed and load-carrying than any other seaplane equipped with one of the best types of European engines. Admiral Sims says: 'The British expressed great confidence in the Liberty motor.'"

Custom Square Deal Department

The Customs Appraiser & Motor Cogs has taken a long stride forward in the development of industrial aviation by the establishment of a Square Deal department in the Division of Customs and Warehouses.

The Square Deal department is for the benefit of all Customs employees, whether in factory or office. Its purpose is to apply the square deal to all employees and to the company itself, by removing the causes of any dissatisfactions that may arise and by placing employees in the positions for which they are best fitted.

Any employee who feels that he or she has been unjustly dismissed, overlooked in promotion, assigned to duties for which they are not best fitted, neglected in wage advances or made the victim, real or imagined, of favoritism or discrimination may bring complaint to the Square Deal department. An investigation is made immediately.

Reboring Machine for Aviators

By a "reboring machine," the first of its kind to be established by the United States Government at any of its offices, aviators will be enabled to have their aircraft according to their ability to thrive in high altitudes.

The machine is in a research laboratory at Barron Field and is in charge of Isaac G. H. Brown, Jr. M. Thomas and James Blinn, who served in Fort Worth recently from Minnesota, N. Y. It provides all the conditions of ascending and descending and has been in use by the German air service, it is said, for five years.

Blindfolded, as pilot from any of the Army fields will be assigned to active duty exercises until he has passed the tests of the machine and been classified according to his ability to withstand altitude fatigue. Experience has taught that many air accidents are due to this fatigue. One man will be so affected that he will faint. Another will go along with his flying mechanism and with his mind as dazed that he cannot plan or execute an attack or an emergency. Still another will become stupefied and his nerves will not react to the excitement of battle.

The pilots will be divided into three classes. In the first class will be placed aviators who are never affected by altitude fatigue and who can ascend and fight anywhere their planes will mount.

In the next class will be those whose mental faculties are dulled by high altitude.

And in the last, or third, will be those who faint under the strain.

Doehler to Build Addition

Ground has been broken for the new addition to the Doehler-Ben-Casting Co.'s Brooklyn factory on Court and Huntington streets. This addition will cover 188 ft. on Court street and 280 ft. on Huntington street, and will be 141 stories high, actually doubling the present capacity of the plant.

Construction will be of steel and concrete throughout, to conform to the general character of this present structure.

Newly perfected types of automatic discharging machinery are now in process of construction, ready to be installed in the new building, which is to be ready for occupancy before the summer of 1919.

Contract for F5 Surfaces

Curzon Aeroplane Motors, Ltd., Toronto, Canada, has been awarded a contract for F5 surfaces by the Bureau of Supplies and Aeronautics of the Navy.

Statement on Aircraft Production

At the suggestion of Representative S. Hubert Dent, Jr., chairman of the House Committee on Military Affairs, the Secretary of War under date of June 28 made a written statement in regard to the progress of various military activities.

Under the head of aircraft production, embracing training planes, bombing planes, combat planes and guns there is the production of Liberty engines, Secretary Baker gives the following figures:

"Delivery of elementary training planes to June 8, 460, deliveries of advanced training planes to June 8, 830.

"The average weekly production of advanced training planes during April was 22; during May was 45(1); and ending June 8 was 73.

"To June 8, 286 combat planes were delivered. The weekly average of this type of machine to April was 5, in May, 15, and for the week ending June 8 was 24.

"Six thousand eight hundred and eighty elementary training engines were delivered to June 8; 2133 advanced training engines were delivered to same date.

"More than 2000 Liberty engines have now been delivered to the Army and the Navy. The average weekly production in April was 36, in May 34, and in the first week of June 118. Thirty-seven thousand two hundred and fifty machine guns were delivered for use in airplanes before June 8."

Maximum Fire Prices

Following a conference with the judges and leader members of the Pacific Northwest Iron and Steel Committee of the War Industries Board has established the following maximum prices for a period of thirty days from June 10:

Fire bars delivered at maximum prices to retail operators: No. 1, \$18 per thousand; No. 2, \$16, and No. 3, \$12 for 48 ft. lengths, over 48 ft., price to be on same basis as established by custom or as decided by the Liaison Section of the Board. Prices of fire lumber for aircraft are to remain the same as now.

These prices represent an average increase of approximately 25.75 per cent over former prices to the Government and are final.

Contracts are to be made subject to an action by the Government, under which option suppliers will be allocated either to the Government or to other essential users in any extent required.

De Post Gives Y. M. C. A. Airplane

Irving De Post, head of the De Post concerns at Wilmington, Del., has presented to the School for Aeronautics, conducted by Walter H. C. C. A. of 218 West Fifty-seventh street, New York City, a complete airplane, which is to be brought over for the use of the school. Y. F. Tenny, principal, and W. D. Barry, instructor, have gone to Claymont, Del., to receive the gift and bring it here, in the air of general interest to have transportation. The plane is a Curtiss J-3, a military trainer machine. Mr. De Post's letter announcing the gift says among other things: "We have concluded, in view of the national importance of your school, that we will make a donation of the machine to you."

The School for Aeronautics Machine has grown so rapidly since it was opened last fall that it has been necessary to rent additional quarters. Part of the building at 240 West Fifty-seventh street has been in use from the beginning and is in operation from 9 a. m. to 11 p. m. in study except hours. In June 221 students were enrolled, a total of 922 for the seven months. The new quarters are at 230 West Fifty-seventh street. The plane construction will be given here, the old school being devoted to engine work.

Anglo-Norwegian Air Mail Planned

The submarine warfare has made the sea route an irregular across the North Sea that the scheme for an airplane service is being enthusiastically pushed forward by a Norwegian company with the backing of the Norwegian Government. The journey across the North Sea has always been made in 10 days, and it is estimated that, in a regular service, the ordinary average time would be under 4½ days.

The British Government, while it has no surplus to spare for such equipment at war time, is prepared to give the Norwegian company every facility.



Airships — Military Kits and Spherical Balloons
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Everything is Rubber for the Airplane
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The heaters are so flexible that their location is difficult to detect except by the heat they produce.

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- 1 Used Tractor Airplane, equipped with engine.
- 2 New Flying Boats, equipped with engines.
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All in perfect condition. Prices range from \$5200 to \$11300

Address Box 12, AVIATION AND AERONAUTICAL ENGINEERING
120 West 32d Street, New York





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542 Rockefeller Building, CLEVELAND, OHIO, U.S.A.



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THE JOHNSON PATENT

ADJUSTABLE HAND SCREW

is the first real improvement in years over the old style Wood Hand Screw.

JAWS CAN BE ADJUSTED TO ANY ANGLE. This is a decided advantage, as it saves the time usually spent in squaring up irregular surfaces. A single clamp will adjust to any of the positions shown, or any modification of them. One jaw can also be made to overlap the other.

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This Company has unusual facilities for applying Luma to dials of every description. The service is convenient and economical for manufacturers and assures uniformly satisfactory results.

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We have shipped 43,719 Counterbalanced Crankshafts to July 5, 1918

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**JAMESTOWN
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JAMESTOWN, N. Y., U. S. A.

AIR PLANE DRY KILNS

We are prepared to design, equip, install and operate according to Aircraft Engineering Division Specification No. 20,500-A.

- I. *Grand Rapids Vapor Process Kilns* (as perfected thru the erection of 2,000 kilns in high class woodworking plants).
- II. *Tremont Humidity Regulated Kilns* (as designed and developed by the Forest Products Laboratory at Madison, Wisconsin).
- III. *Tremont-Grand Rapids Combination Kilns* (combining the scientific points of the Tremont kiln with the practical experience of the Grand Rapids Veneer Works, subject to operation by either method).

Remains of combination Grand Rapids-Tremont kilns have just been selected and purchased for the United States Government Experimental Department at McCook Field and for the United States Government Aircraft Repair plant at Suresbore in France.

In addition we have designed or equipped kilns for—

STANDARD AIRCRAFT CORPORATION, 1 unit	BRASS AIRCRAFT COMPANY
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Submit your drying problem to experts who make a specialty of kiln design and are prepared to furnish and install all equipment and instruments

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OVER TWENTY TYPES OF PROPELLERS
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Radiators**



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These Count in Aeroplane Construction

NON-INFLAMMABLE

Cellulose Acetate Base

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Transparent — Waterproof

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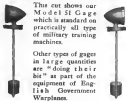
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"BAKELITE Moulding" Materials are plastics which are readily fusible, admitting of easy and accurate placing of inserts of any metal of any shape at any angle. Their original forms are either granular powders or plastic sheets.

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2001-18



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Furnished for
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It works close to finish, thereby eliminating
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No. 15 PULLEY MILLER

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It is the only machine of its kind in the world.

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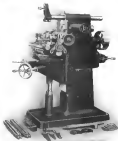
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